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Amphibia, Anura, Centrolenidae: *Cochranella orejuela*, first country records from Ecuador.

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Knowledge about the diversity of Ecuadorian centrolenids has increased notably over the past four years. Recent contributions include descriptions of new species, taxonomic revisions, and reports of distributional extensions at national and local levels (Guayasamin and Bonaccorso 2004; Cisneros-Heredia and McDiarmid 2005; 2006a; 2006b; 2007a; 2007b; Cisneros-Heredia and Guayasamin 2006; Guayasamin et al. 2006a; 2006b; Bustamante et al. 2007; Cisneros-Heredia 2007; Cisneros-Heredia and Meza-Ramos 2007; Cisneros-Heredia and Yánez-Muñoz 2007a; 2007b; Guayasamin and Trueb 2007). However, many areas across Ecuador remain unexplored or poorly sampled and several specimens remain unidentified in museum collections. Recent expeditions carried out by the *Museo Ecuatoriano de Ciencias Naturales* to foothill areas in northwestern Ecuador resulted in the collection of three specimens of a species previously unreported for Ecuador, *Cochranella orejuela*, which we report herein.

Specimens are deposited at the *División de Herpetología, Museo Ecuatoriano de Ciencias Naturales*, Quito, Ecuador (DHMECN). In addition, one of us (DFCH) examined two type specimens of *Cochranella orejuela* at The University of Kansas, Natural History Museum, Lawrence, USA: KU 145081 (holotype, adult male) and KU 145080 (paratype, adult female), collected between El Tambo and La Costa, department of Cauca, Colombia, at 800 m, elevation on 17 August 1937. We follow Sierra (1999) and Cisneros-Heredia (2006; 2007) for vegetation and biogeographic classifications. Characters, terminology, and taxonomic arrangements follow Cisneros-Heredia and McDiarmid (2007b).

Cochranella orejuela (Duellman & Burrowes, 1989) was previously known to inhabit the Pacific foothills and low montane Andean regions of southwestern Colombia between 800 and 1250 m elevation, with two localities at the departments of Cauca and Nariño (Duellman and Burrowes 1989) and a third one at the department of Valle del Cauca (Castro et al. 2004). *Cochranella orejuela* was recently collected in three localities at the province of Pichincha, northwestern Ecuador: DHMECN 04309 (Figure 1) from the Bosque Protector Mashpi (78°52'2.32" W 00°10'2.34" N; 1200 m), collected by M. H. Yánez-Muñoz and C. Castro M., on 02 May 2007 (Figure 2); DHMECN 04551 from the River Chalpi (78°51'28.87" W 00°13'32.38" N; 615 m) and DHMECN 04552 from the River Anope (78°48'58.34" W 00°12'45.54" N; 1080 m), both at the surroundings of the town of Saguangal, collected by M. Herrera-M, S. Villamarín C. and J. Rivadeneira R., on 23 June 2007 (Figure 2).

Figure 1. An adult female of *Cochranella orejuela* from the Bosque Protector Mashpi, province of Pichincha, Ecuador (DHMECN 04309). Photo by M. H. Yánez-Muñoz.

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The three localities are part of the Chocó biogeographic region and are covered by Foothill Evergreen Non-Seasonal forests. They constitute the first records of *Cochranella orejuela* in Ecuador, extending its distributional range ca. 140 km south from the nearest know locality (Pialapí, department of Nariño, Colombia), and its lower altitudinal level down to 615 m elevation.

All specimens are adult females. The specimen collected at Mashpi (DHMECN 04309) was found at night sitting on the upper side of a leaf next to a waterfall ca. 1.5 m above water. Specimens from the Chalpi and Anope rivers (DHMECN 04551–2) were collected by electro-fishing during the day along the steepest part of the streams, next to waterfalls (frogs were presumably resting on rocks along the streams). All three specimens are morphologically similar to specimens of the type series. *Cochranella orejuela* was sympatric at Mashpi with *Centrolene prosoblepon* and an undescribed species of *Cochranella* that will be described elsewhere and that we refer to as *Cochranella* sp. N11 (Table 1), and with *C. prosoblepon* and *Hyalinobatrachium* cf. *valerioi* at the surroundings of Saguangal.

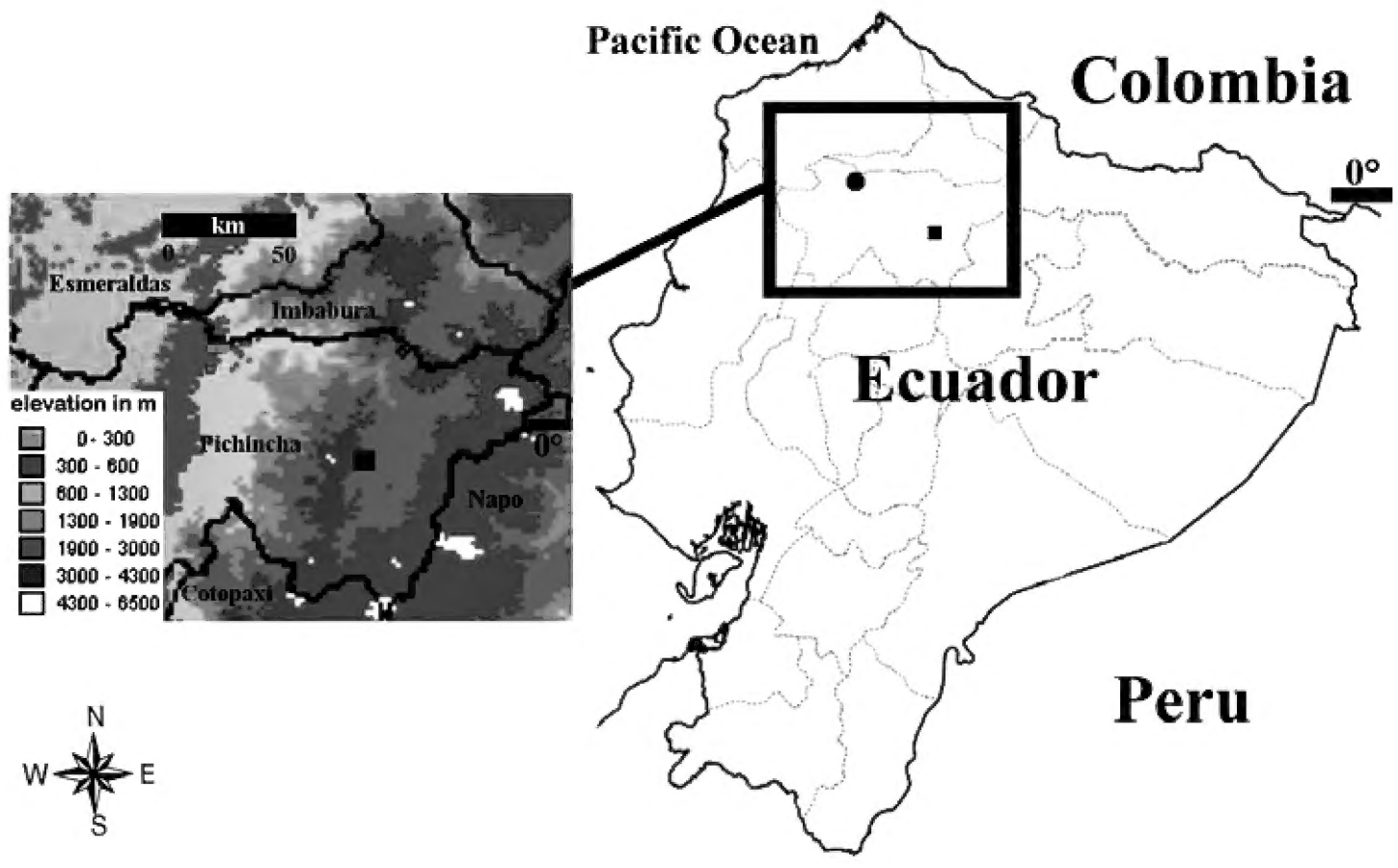

Figure 2. Right: Map of Ecuador showing the general location (black dot) of the new localities for *Cochranella orejuela*. Left: Map of the enlarged area showing the three localities for *Cochranella orejuela* in Ecuador; blue dot, Mashpi; red dots, surroundings of Saguangal. Square corresponds to Quito, capital of Ecuador. Precise locations can be visualized in Google Earth by downloading the Supporting Online Material file (http://www.cisneros-heredia.org/centrolenidae/orejuela/orejuela.kmz).

Two of the Ecuadorian localities of *Cochranella orejuela* are in foothill areas on the base of the Andes (800–1100 m elevation) and one is in lowland areas (< 800 m). Six Ecuadorian glassfrogs also occur in lowland and foothill areas, such as *Cochranella orejuela*, while ten species are exclusive to the foothills and 15 to the lowlands (Table 1; Cisneros-Heredia and McDiarmid 2007b). Knowledge on the Ecuadorian foothill areas is very limited and few scientific expeditions have explored them, with most glassfrog species from these areas been reported or described recently (Table 1; Cisneros-Heredia, 2007; Cisneros-Heredia and McDiarmid 2007a; 2007b; Cisneros-Heredia and Meza-Ramos 2007; Cisneros-Heredia and Yánez-Muñoz 2007). More research is needed to have a better understanding of the diversity, distribution, ecology, and evolution of the amphibian communities from the Andean foothills, one of the most threatened areas in Ecuador due to habitat loss and fragmentation (Sierra 1999).

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Table 1. Glassfrogs (Anura: Centrolenidae) from lowland (0 to 800 m elevation) and foothill areas (800 to 1100 m elevation) of Ecuador. Different background shades represent different altitudinal distributions: white = species exclusive from the lowlands; light gray = species that inhabit lowlands and foothills; dark gray = species exclusive from the foothills. Superscripts on the distribution section are for: *Geopolitical Endemism*: [E] = Endemic to Ecuador; [E-C] = Endemic to Ecuador and Colombia; [E-P] = Endemic to Ecuador and Peru; [E-C-P] = Endemic to Ecuador, Colombia, and Peru. *Biogeographic Endemism*: [WE] = Endemic to the West Ecuadorian biogeographic region. [CH] = Endemic to the Chocoan biogeographic region.

Species	Distribution	First source of information
Centrolene callistommum	Pacific lowlands [E/CH]	Guayasamin and Trueb (2007)
Centrolene litorale	Pacific lowlands [E-C/CH]	Grant and Morales (2004)
Centrolene sp. "Palenque" [1]	Pacific lowlands [E/WE]	Cisneros-Heredia and McDiarmid (2007b)
Cochranella albomaculata	Pacific lowlands	Guayasamin et al. (2006b)
Cochranella mache	Pacific lowlands [E/WE]	Guayasamin and Bonaccorso (2004)
Cochranella pulverata	Pacific lowlands	Bustamante et al. (2007)
Cochranella spinosa	Pacific lowlands	Duellman and Burrowes (1989)
Hyalinobatrachium aureoguttatum	Pacific lowlands [CH]	Bustamante et al. (2007)
Hyalinobatrachium fleischmanni	Pacific lowlands	Noble (1924)
Centrolene ilex	Pacific lowlands and western foothills	Guayasamin et al. (2006b)
Centrolene prosoblepon	Pacific lowlands and western foothills	Boulenger (1898)
Cochranella orejuela	Pacific lowlands and western foothills [E-C/CH]	This work
Hyalinobatrachium valerioi [2]	Pacific lowlands and western foothills	Duellman and Burrowes (1989)
Cochranella sp. N11 [3]	Pacific lowlands and western foothills [E/CH]	D. F. Cisneros-Heredia, M. H. Yánez-Muñoz and H. M. Ortega-Andrade (unpubl.)
Centrolene lynchi	Western foothills [E-C]	Lynch and Duellman (1973), Duellman (1980)
Nymphargus buenaventura	Western foothills [E/WE]	Cisneros-Heredia and Yánez-Muñoz (2007b)
Centrolene grandisonae	Western foothills (marginally) [E-C]	Duellman (1980)
Centrolene durrellorum	Eastern foothills [E]	Cisneros-Heredia (2007)
Centrolene sp. N4 [4]	Eastern foothills [E-P]	D. F. Cisneros-Heredia, P. J. Venegas, M. Rada and R. Schulte (unpubl.)
Cochranella flavopunctata	Eastern foothills [E-C]	Lynch and Duellman (1973)
Cochranella puyoense	Eastern foothills [E]	Flores and McDiarmid (1989)
Nymphargus cochranae	Eastern foothills [E-C?]	Goin (1961)
Nymphargus laurae	Eastern foothills [E]	Cisneros-Heredia and McDiarmid (2007b)
Hyalinobatrachium ruedai [5]	Eastern foothills [E-C]	Cisneros-Heredia and McDiarmid (2007a)
Cochranella amelie	Amazonian lowlands and eastern foothills [E]	Cisneros-Heredia and Meza-Ramos (2007)
Cochranella ametarsia [6]	Amazonian lowlands	Guayasamin et al. (2006a)
Cochranella midas	Amazonian lowlands	Lynch and Duellman (1973)
Cochranella resplendens	Amazonian lowlands [E-C-P]	Lynch and Duellman (1973)
Cochranella sp. N1 [7]	Amazonian lowlands [E]	M. Bustamante and J. M. Guayasamin (unpubl.)
Hyalinobatrachium sp. N12 [8]	Amazonian lowlands	Yánez-Muñoz and Chimbo (2007)
Hyalinobatrachium munozorum	Amazonian lowlands [E-C-P]	Lynch and Duellman (1973)

Notes

[1] Putative new species from the West Ecuadorian Region (Río Palenque Scientific Center), apparently related to *Centrolene litorale*, being studied by R. W. McDiarmid and D. F. Cisneros-Heredia.

[2] It includes populations referred as *Hyalinobatrachium* sp. A and sp. B by Cisneros-Heredia and McDiarmid (2007a). These Ecuadorian populations differ in some coloration and morphological characters between them and also from Central American populations of *H. valerioi*, but the differences are continuous or on characters that exhibit large intraspecific variation. Further analyses, including molecular data, are needed to clarify if these populations belong to one (*H. valerioi*) or more species.

[3] Putative new species from the Chocoan Region, apparently related to *Cochranella spinosa*, being studied by D. F. Cisneros-Heredia, M. H. Yánez-Muñoz and H. M. Ortega-Andrade.

[4] Putative new species from the southeastern Andean foothills of Ecuador and northeastern Andean foothills of Peru being studied by D. F. Cisneros-Heredia, P. J. Venegas, M. Rada and R. Schulte.

[5] Cited as *Hyalinobatrachium* sp. Z1 in Cisneros-Heredia and McDiarmid (2006a: Table 5).

[6] Cited as *Cochranella* sp. Z2 in Cisneros-Heredia and McDiarmid (2006a: Table 5). Possibly conspecific with *Cochranella oyampiensis* (Cisneros-Heredia and McDiarmid 2007b; Kok and Castroviejo 2008).

[7] Putative new species from the northern Amazonian lowlands (Cuyabeno), being studied by J. M. Guayasamin and M. Bustamante.

[8] A population from the northern Amazonian lowlands apparently related or conspecific with *Hyalinobatrachium iaspidiense*.

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